

OTS: 60-11,572

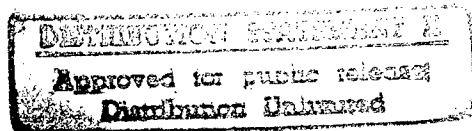
JPRS: 2597

6 May 1960

SELECTED TRANSLATIONS ON SOVIET INDUSTRIAL DEVELOPMENT -- No 8

DTIC QUALITY INSPECTED 2

TO MAIN FILE



Distributed by:

OFFICE OF TECHNICAL SERVICES  
U. S. DEPARTMENT OF COMMERCE  
WASHINGTON 25, D. C.

Price: \$1.25

---

U. S. JOINT PUBLICATIONS RESEARCH SERVICE  
205 EAST 42nd STREET, SUITE 300  
NEW YORK 17, N. Y.

19980109 034

JPRS: 2597

CSO: 3000-N/8

SELECTED TRANSLATIONS ON SOVIET INDUSTRIAL DEVELOPMENT -- No 8

<u>Table of Contents</u>	<u>Page</u>
1. Development of the National Economy of the Armenian SSR During 1959-1965. . . . .	1
2. A New Large Petroleum Region. . . . .	17
3. The Expansion of Pipeline Transport in Kazakhstan. . . . .	20
4. Some Problems in Connection With the Planning of Oil Refineries. . . . .	24
5. Long-Range Plans for Developing a Coal Base for Coking in the Southern USSR. . . . .	31
6. Increase Capacities More Rapidly in Ferrous Metallurgy. . . . .	40

1. Development of the National Economy of the Armenian SSR  
During 1959-1965

[This is a translation of an article written by L. Khachatryan in Planovoye Khozyaystvo (Planned Economy), No 9, Sep 1959, pages 59-69.]

The Seven-Year Plan of Development of the National Economy of the Armenian SSR is a component part of the extensive program of economic and cultural development of the USSR in the years 1959-1965, outlined in the decisions of the 21st Congress of the Communist Party of the Soviet Union. This Plan provides for a further intensive increase in the industrial and agricultural production of the republic, for an upsurge in the welfare and cultural level of the Armenian people, which proceeds undeviatingly together with the entire Soviet people along the path of the building of the communist society.

The drafting of the long-range plan of development of the national economy of Armenia in the years 1959-1965 has been conducted directly in enterprises, kolkhozes and sovkhozes, and thereupon coordinated by the Sovnarkhoz and Gosplan [Council of National Economy and planning committee of the Council of Ministers] of the republic. The participants in the drafting of the plan included tens of thousands of workers, kolkhozniks, engineers and technicians. The compilation of the republic's Seven-Year Plan was preceded by the drafting in 1957, by the Gosplan Armenian SSR, of a working hypothesis for the development of industry in the next 10-12 years and estimates of the annual population growth until 1957 according to the principal demographic characteristics. This work has made it possible to determine the most rational trends in the development of the republic's national economy over the Seven-Year Period commensurately with the republic's raw material and manpower resources and to determine the long-term role of the republic in the Union-wide division of labor.

The subsequent preparatory labors on the compiling of the draft of the Seven-Year Plan by the Gosplan, Sovnarkhoz and the scientific-research institutes, served to work out a number of actual complex problems, inclusive of the determination of the paths of further development of the republic's power base, the developmental trends of nonferrous metallurgy on taking into account the necessity of introducing within the next few years the omnilateral recovery of all useful ore components, possibilities for a rapid

growth of the chemical industry on the basis of the utilization of natural gas, organization of new types of production, in particular synthetic and artificial fibers, and plastics, distribution of agricultural production and its specialization according to the republic's zones, and so forth. Also drafted were preliminary balance-sheet estimates of manpower resources, principal types of minerals, agricultural raw materials, consumer income and consumer spending.

All this has served as a foundation for the detailed drafting of the Seven-Year Plan, for selecting the most rational paths for the development of branches of the national economy and primarily of industry. Industrial output in Armenia during the Seven-Year Period will increase more than 2.3 times, and its annual rate of increment will be 12.7 percent compared with 11.1 percent during the preceding seven-year period (1952-1958). In this connection, the absolute value of each percent will be 2.1 times greater. In per capita terms, industrial output will approximately double.

The chemical industry of Armenia will be notably expanded. The capital investments in that industry will be sixfold greater than in the preceding seven-year period. The volume of output of the chemical industry will increase 3.3 times in 1965 compared with 1958. Natural gas will be broadly used as a technological raw material for the chemical industry, and this will alter radically the nature and economics of the industry. Until recent years, Armenia's chemical industry used to develop along the line of the electric-power-consuming types of production -- electrothermy and electrolysis processes. The production of acetylene from natural gas will be doubles in volume and its costs will be cut in half with an equal consumption of electrical energy, when done by thermo-oxidizing pyrolysis. The resulting gas wastes can be returned as fuel to a large heat and electric power center being constructed in Yerevan, together with enterprises of the chemical industry which consume steam in large quantities. At present the problem of the further technological utilization of the synthesis-gas for recovering methanol, urea, and other valuable chemicals is being worked out.

In the course of the Seven-Year Plan an acetate silk plant and a "kapron" cord plant will be built. The chemical industry will manufacture plastics for the electrical engineering, machine building, light and other branches of industry. The output of rubber and mineral fertilizers will increase 1.6 times, the output of automobile tires -- 1.4

times; and the output of rubber accessories, varnishes and other articles will also increase.

In contrast to past years, when a considerable part of the output of the chemical industry was exported from the republic in the form of intermediates, now an overwhelming part of that output will be processed into finished marketable products within the republic itself. The chemical industry will manufacture many new products, including synthetic fibers, plastics, vinyl polychloride tars, vinylflex, acetyl cellulose, melamine, synthetic corundum, vitamins, and others. The considerable successes achieved by the Institute of Fine Organic Chemistry, Academy of Sciences Armenian SSR, in the field of the synthesization of medicinal preparations, the availability of highly skilled specialists in this field and of the reserves of the necessary raw materials will serve as the basis for organizing the manufacture of complex organic compounds and medicinal preparations during the seven-year period in the republic.

To ensure the extensive volume of work on the expansion and modernization of the chemical industry, a large scientific research design institute is being established under the Sovnarkhoz. The help of Academy of Sciences Armenian SSR is being enlisted in the working out of a number of the principal problems of the development of chemistry. Plant laboratories are being expanded and provided with the newest equipment.

In the years 1959-1965 the scope of another leading branch of industry in the Armenian SSR -- nonferrous metallurgy -- will grow considerably, and its structure will change. The republic's nonferrous metallurgy is endowed with many opportunities for rapid development. The presence of large explored reserves of copper and molybdenum and noble and rare metals, zinc, lead, and aluminum raw material, not only ensures for a long time the raw material needs of the existing mining enterprises and those under construction, but it also serves as a reliable base for the organization of new types of production necessary for the national economy. The output of nonferrous metallurgy in 1965 will be 2.6 times as large as in 1958. Enterprises of nonferrous metallurgy are being constructed and expanded.

In the course of the seven-year period, new, more powerful and productive types of equipment will be introduced into the mining industry; the bulk rock in the major copper-molybdenum deposits will be extracted exclusively by the open-strip method. More progressive technological schemes for the concentration of ores and use of high-grade flotation

reagents in concentrator plants will make it possible to improve considerably the technical-economic indexes of the recovery of metals during the concentration of ore and of the recovery of all valuable components from the ore.

Over the seven-year period, the plants of the Alaverdi Copper-Chemical Combine will be completely overhauled and considerably expanded. The redevelopment and expansion of the combine will serve to increase copper output substantially. At that Combine, reverberatory and water-jacket-furnace smelting will be supplanted by electric smelting which will at the same time serve to recover a highly concentrated  $\text{SO}_2$  gas for the production of sulfuric acid. The tower system of sulfuric acid production will be supplanted by the contact system.

An important role in increasing the output of non-ferrous metals and other valuable products will be played by the construction of a new mining-chemical combine on the basis of nephelinic syenites. In addition to alumina, that combine will produce a large amount of cement, sodium metasilicate and yerevanite, which serve as raw materials for the founding of high-grade crystal glass, high-grade glass, and spectrally pure alumina, which are thus obtained in less restricted amounts and at a fraction of the cost of those obtained from rock crystal. The capital investments in the construction of this combine will be recouped within the next few years. The output which it will provide will serve as the basis for establishing enterprises for the production of detergents, bleaching agents and degreasing agents needed by the textile, food and metal-processing industries, and enterprises for the founding of high-grade mirror glass, crystal, and articles of pure silica for the semiconductor industry.

A relatively new branch of industry in the republic is machine building. This branch essentially began to develop only in the prewar years but, once started, its development was rapid. As a result, already by 1958 the share of machine building output accounted for 16.2 percent of the republic's gross industrial output. The over-all volume of output of the machine building industry during the seven-year period will increase more than 3.7 times, and machine tool building alone -- eightfold. In the years 1959-1965 the investments to be made in machine building will be thrice as high as in the preceding seven years. In 1965 the share of machine building in the republic's gross industrial output will climb to 25 percent, while the output of the other branches of industry will also rise steeply in terms of

absolute figures. Plans exist for the construction and activation of 19 machine building-plants, inclusive of machine tool plants, instrument building plants, and others.

Armenia's machine tool building industry will manufacture over 50 type-sizes of new up-to-date metal-cutting machine tools, inclusive of various types of screw-cutting lathes, grinding, radial-boring and midget precision machine tools for the instrument building and watchmaking industry, and widely universal copying and milling machine tools.

The republic is organizing the production of the allied branches of the machine building industry manufacturing the complementing tools which at present have to be imported from other, and sometimes quite distant, economic rayons. This pertains to machine-tool gages, hydraulic apparatuses, plastic and rubber accessories and articles, technological equipment and special tools and magnetic starters. The manufacture of these articles is being organized on a scale which satisfies the demand of the republic and of the neighboring economic rayons. Also being organized is the manufacture of stone-quarrying, stone-cutting and stone-working machinery and machine tools for mechanizing the operations pertaining to the extraction and shaping of natural wall materials. New centralized types of production pertaining to the casting of pig iron and nonferrous metals are being organized to promote the mechanization and "conveyerization" of foundry operations. Centralized shops for the production of forgings and stampings are being established.

The leading place in Armenia's machine building is occupied by the electrical engineering industry. The Seven-Year Plan provides for a 4.5-fold increase in the output of the electrical engineering industry and a sevenfold increase in the output of the instrument building industry. The development of the electrical engineering industry will basically proceed on the basis of the expansion and modernization of existing enterprises, which will ensure a high yield of output per capital-investment ruble.

Instrument building will develop in the direction of the manufacture of instruments for the control and regulation of temperature and pressure in the chemical industry and nonferrous metallurgy, manufacture of complete sets of instruments for the measurement and automatic regulation of temperature and pressure, moisture and viscosity, and for the measurement of salinity in water. The other instruments to be manufactured will be those designed for furthering labor safety, inclusive of high-tension indicators, split-electromagnet current meters and current hangers. In the course of the

Seven-Year Plan, Armenia will become one of the centers of the manufacture of high-speed electronic calculating machines, the design and development of which is being successfully completed by the Yerevan Scientific Research Institute of Mathematical Machines.

The machine-building enterprises will increase their output of compressors, centrifugal pumps, spare parts for automobiles, and technological equipment for the food industry, and they will master the manufacture of air-conditioning equipment. The production of objects in popular demand -- electric-lighting accessories, electric pressing irons, heaters, desk lamps, clocks, etc. -- will be considerably expanded.

The following new scientific research establishments and design and experimental bases have been founded in the republic: Branch of the Scientific Research Institute of the Electrical Industry, Institute of Mathematical Machines, "Prompribor" [Industrial Instruments] Special Design Bureau, the "Avtomatika" Special Automation Design Bureau, with their own production bases, and a number of plant design bureaus. In the two years of their existence the collectives of these organizations have devised designs of a number of new improved machinery and instruments. All the developed designs are being successfully introduced in industry. The scientific research and design and experimental work is expected to be further expanded in the course of the Seven-Year Plan.

To ensure the intended expansion of industrial output, the primary task is to consolidate the power-generating base of the republic. Calculations show that the electrical energy demand of Armenia's national economy will rise 1.8 times by the year 1965. Such a pace of growth in the consumption of electrical energy requires the establishment of new generating capacities. Hitherto the principal power generating base of Armenia used to be the hydroelectric power stations of the Sevano-Razdan Rapids. The Seven-Year Plan provides for the further construction of power stations on these rapids. The construction of the Atarbekyan and Yerevan GES'es [hydroelectric power stations] is being completed, and the construction of the Tatevskaya GES will be initiated so as to activate its first unit in 1965.

However, the construction of all these hydroelectric power stations will not satisfy completely the republic's demand for electrical energy. In this connection, the Seven-Year Plan provides for building in Armenia thermal electric power stations which burn natural gas as fuel. The deliveries

of natural gas to Armenia from the fraternal republic of Azerbaydzhani, which will commence in 1960, will make it possible to solve the problem of providing electrical energy at considerably lower capital investments and within much shorter periods. Two large thermal electric power stations will be built in the republic -- in Yerevan and Razdan. As a result, by the end of the seven-year period the share of thermal electric power stations in the generation of electrical energy in the republic will amount to 62 percent. Under construction is an electric transmission line consolidating the power grids of the Transcaucasian republics within a single integrated power system.

The successful fulfillment of the extensive volume of capital investments envisaged by the Seven-Year Plan requires an intensive development of the building materials and construction industry. The investments in this branch alone will total 725 million rubles compared with 293 million rubles in the preceding seven years. The purposive and proper allocation of these funds will make it possible to master in minimum time the paramount task facing the builders -- the transition to the construction of fully prefabricated housing and the supplying of construction sites with industrially manufactured parts and structures.

Despite the extensive resources of tuffs, pumice and volcanic slags, these materials are as yet being inefficiently used in construction. Walls are erected by the method of the archaic manual superposition of "midisas" of small irregularly shaped blocks which, considering the labor it involves, prolongs the construction periods. In this connection, it is expected that the problem of the production of large artificial tuff-concrete blocks and large panels will be resolved within the next two or three years. The year 1961 will witness the opening of a large blocks plant on the Artikskoye Tuff Deposit, with an output capacity of 250,000 m<sup>3</sup> annually. In 1960 the first large-panel housing construction plant with a capacity of 35,000 m<sup>2</sup> of dwelling area will be activated, and in 1961 this will be followed by the opening of two additional plants with a combined capacity of 85,000 m<sup>2</sup> of dwelling area. This will be accompanied by the production of properly shaped blocks of natural stones, the output of which will be raised to 500,000 m<sup>3</sup> by 1965.

In the plan, considerable attention is given to lightweight, fractionated concrete aggregates, whose output will be raised to four million m<sup>3</sup> by 1965, a fact which will make it possible to satisfy the demand of the neighboring republics also. Sizable funds are being assigned for the

production of precast reinforced concrete, whose output will be raised from 70,000 m<sup>3</sup> in 1958 to 450,000 m<sup>3</sup> in 1965; this will make it possible to increase the extent of the use of such concrete per million rubles worth of construction and installation operations from 89 m<sup>3</sup> in 1958 to 335 m<sup>3</sup> in 1965. In 1959, in Yerevan, the construction of the first plant for the production of rolled large-panel "room-size" partitions with an output capacity of 400,000 m<sup>2</sup> will be completed.

The chemical industry developing in the republic will serve as the basis for organizing the production of new building materials and products replacing scarce materials (timber, metal). In particular, the production of plastics products for construction will be expanded.

At the Ararat Cement-Slate Combine the output of cement will be nearly doubled in 1965 in comparison with 1958. The output of lime will increase 3.7 times, and of alabaster -- 1.7 times; At the Yerevan Building Materials Plant an asbestos-cement pipe shop with a capacity of 800 nominal kilometers of pipe annually will be organized, and a ceramic pipe shop with a capacity of 8,500 tons will be activated. Enterprises for the production of joinery, fittings, shaped parts, and other products are being established.

The organization in the republic of the manufacture of artificial and synthetic fibers, and the increase in the output of agricultural raw materials, create the conditions for the subsequent development of the light industry. The rise in the output of light industry will occur through the construction of new enterprises and expansion of existing ones; the Silk Weaving Mill imeni Lenin in Yerevan is being expanded with 300 looms; new knitwear mills are being built, and old ones are being expanded with the new mills being designed to process mainly artificial fiber instead of cotton yarn. The Leninakan and Yerevan worsted yarn combines are being expanded. A carded yarn shop is being built in Leninakan. The output of cotton fabrics will be increased to 88 million meters in 1965 compared with 66.56 million meters in 1958; wool fabrics -- 5.8 million meters, compared with 3.6 meters; silk fabrics -- 11.5 million meters, compared with 6.6 million meters; and knitwear goods -- 30.6 million units, compared with 21.5 million units. The conversion to the new synthetic and artificial raw materials will improve considerably the quality of the manufactured knitwear goods. The output of leather footwear will be increased to 7.5 million pairs in 1965 compared with 4.6 million pairs in 1958. During the seven-year period, a crystal plant using yerevanite and a combine for the production of machine-made rugs will be built.

The volume of the food industry will increase 1.7 times over the course of the seven-year period. Emphasis will be placed on developing the winery and canning industries in connection with the further growth of viniculture and horticulture, which will make it possible nearly to double the output of wine and cognac products and canned foods. To assure such a rise in output, new cognac and wine distilleries and fruit and vegetable canneries will be established. The refrigerating capacities necessary for producing semisweet wines will be considerably enlarged, and the capacities for bottling vintage wines will be expanded. The meat and dairy industry is facing major tasks with regard to the reception and processing of the increasing amounts of animal-husbandry produce.

In connection with the limited extent of the republic's forest resources, its timber-processing industry will develop along the line of a more rational utilization of the lumber from valuable tree species. Although the output of lumber will be reduced by 26 percent, the output of furniture will increase 1.6 times. This will be achieved by increasing the production of compact furniture, curved furniture, and soft and wood-and-metal furniture. The wastes of the sawmills and of the plywood industry will be the raw material basis for constructing a wood-shavings board and mosaic parquet plant.

Considerable attention in the seven-year period will be paid to the development of the republic's local industry and industrial cooperatives, whose output will increase 1.5 times in 1965. The manual production of rugs and carpetings is expected to increase. In 1965 the production of hand-crafted napped rugs will be increased to 150,000 m<sup>2</sup>. For this purpose, nine workshops with 1,400 rug looms will be established in the republic's regions. A considerable expansion of the network of consumer-servicing enterprises is in the offing.

The implementation of the Seven-Year Plan will result in radical shifts in the structure of industrial production, basically consisting in a rise in the role of nonferrous metallurgy, chemical industry, machine building and metal working industries.

The Seven-Year Plan provides for an improved geographical distribution of industrial enterprises in the republic on taking into account the raw material and manpower resources, the most suitable industrial profiling of the individual regions of the republic, specialization of plants, etc. In the past, industrial enterprises were built mostly in Yerevan,

Leninakan, Kirovakan, Alaverdi, and Zangezur. During the 1959-1965 period, new enterprises will be built in regions which had hitherto lacked industry. New industrial centers are being established in Razdan, Lusavan, Dilizhan, and others. New plants -- plants for the manufacture of hand tools, boring machines, and chemical equipment, enterprises for the manufacture of reinforced concrete products and inert concrete aggregates -- are mushrooming in the settlement of Lusavan. The following new enterprises will arise in Sevan-skiy Rayon: glass fiber plant, actuating mechanisms plant, etc. In the town of Dilizhan a knitwear mill and a precision machine tool plant will be built. In Idzhevan a machine-made rug combine with a capacity of 600,000-700,000 m<sup>2</sup> annually is being built. The Kotayskiy Rayon will become industrially developed through the construction of enterprises for chemical reagents, industrial precision jewels, wood-fiber board, etc.

In the development of Armenia's economy a major factor will be the continuation of the construction of the Yerevan-Akstafinskaya Railroad Line. A 60-kilometer segment of that line has already been built and is in operation. The new railroad line will pass through the republic's mineral rich regions which had hitherto been remote from rail facilities. The building of that line will promote the development of economic and cultural construction in those regions, and the general upsurge in the republic's economy.

The Seven-Year Plan of Development of the National Economy of the Armenian SSR provides for a further increase in the production of all crops raised in the republic, and primarily: grapes -- 2.8 times; fruits -- 2.7 times;  $\sqrt{\text{silkworm}}$  cocoons -- 1.6 times; slaughter-weight meat -- 1.7 times; and milk -- 1.6 times. The increase in all these products is expected to occur mainly through a rise in crop yield and in the productivity of cattle.

During the drafting of the Seven-Year Plan considerable attention was given to the problem of the proper geographical distribution of agricultural production and of its specialization, so as to utilize maximally the potentials latent in the natural-farming conditions of the republic. The rather small territory of the republic encompasses all natural zones -- from the zone of the warmth-loving southern crops to the alpine highland zone.

In the offing is a major program of water-development measures ensuring an increase of 38,000 hectares in the irrigated farming area and an increase of 180,000 hectares in the irrigated pasture area. Vineyards and orchards will be

planted on 44,000 hectares of newly irrigated land. Most of this planting will be done on the sovkhozes being organized on the newly reclaimed lands, in connection with the completion of the construction of Talinskiy, Arzin-Shamiramskiy, and Kotayskiy canals. These measures will ensure after the planted vineyards and orchards grow to full maturity as early as in the first few years after 1965, an increase in the production of wine to nine million decaliters compared with 2.7 millions in 1958; cognac -- one million decaliters, compared with 260,000 decaliters in 1958, and canned foods -- 300 million nominal tins, compared with 77.2 million nominal tins in 1958.

In the field of animal husbandry one of the principal measures to be taken is to ensure the cattle herd a stable fodder base. Plans exist for a considerable expansion of the acreage of fodder crops, and for an increase in the yield of the natural fodder lands as well.

The target figures for the development of the national economy of the USSR envisage investing more than 12 million rubles in the development of the economy and cultural construction of Armenia -- a sum more than twice as high as that invested in the 1952-1958 period. Of that sum, 7.5 billion rubles -- or 63 percent -- will be assigned for developing the branches of material production, in which 6.21 billion will go for industry, and one billion -- for agriculture. The funds assigned for the development of housing and communal economy total 3.6 billion rubles, or 28.5 percent, of the total capital investments, which is 2.9 times as high as the investments made during the 1952-1958 period. The investments in the development of education, science, culture and public health are envisaged at over one billion rubles, which is 2.8 times as high as the investments made for these purposes during the 1952-1958 period.

Major tasks confront all branches of Armenia's national economy with regard to the improving of qualitative indexes. Labor productivity in industry during the seven-year period should be increased by 56 percent, or at a yearly rate of 6.7 percent. Such a rate of increase in labor productivity can be achieved through the specialization of production, introduction of new technology, over-all mechanization and automation of production processes, modernization of equipment, improvement in the organization of production, raising of workers' skills, and the like.

Plans exist for introducing in the course of 1959-1965 the continuous-flow method of production in instrument- and machine tool-building industries, continuous-action

vulcanization of cable products, automated technological lines for the assembling of electric bulbs, machine tools, transformers, generators, etc. Machine tools with storage and bin attachments, high-speed automatic and pneumatic tools, etc., will be broadly employed. The conduct of the above measures will ensure the obtaining of over 73 percent of the total increment in industrial output on account of the increase in labor productivity alone.

The rise in labor productivity per construction worker in the years 1959-1965 will amount to 58.5 percent, or on the average 6.8 percent a year. This increase should be ensured by raising the level of mechanization, continuing the industrialization of construction, using prefabricated structures and units, and other measures.

The increase in the number of workers and employees in the national economy of the Armenian SSR will amount to 30-35 percent in 1965 compared with the 1958 level. New special schools and academies will be organized to mobilize youth for industry. In the course of the seven-year period, 18 new vocational academies will be established on the basis of large enterprises; of these, nine academies will serve to train skilled workers for industry, six -- to train construction experts, and three -- to train experts in the mechanization of agriculture. To ensure industry with more highly and broadly skilled manpower, it is expected that the enrollment of workers in schools and academies in 1965 will increase 3.5 times.

In accordance with the decision of the 21st Congress of the CPSU, the conversion of workers and employees to a seven-hour work day should be completed in 1960. In the first quarter of 1959 the enterprises of the republic's chemical, nonferrous-metallurgy, cement, and ferrous-metallurgy industries have already been converted to the shortened workday. In the further course of 1959, enterprises of the electrical engineering and machine building industries will also be converted to the shortened work day, upon an appropriate revision of wages, and in 1960 this will be extended to the other branches of the republic's industry. As of 1964 a gradual conversion to a 30- and 35-hour work week with a five- and six-hour work day will be initiated.

During the seven-year period the material welfare of the workers will improve substantially. One of the main indexes of the rise in the living standard of the people is the rise in its financial income. Compared with 1958 the financial income of Armenia's population will increase nearly 1.5 times.

The rise in the retail turnover of State and cooperative trade will amount to 73 percent over the seven-year period, and, in this, the rise in "public feeding" [canteens, etc.] alone will be 78 percent. In this connection the rise in retail trade turnover in the countryside will be somewhat higher (approximately 80 percent), as a result of a lag in rural retail trade and a rise in the income of kolkhoz members. To ensure private home construction, which has entered into full swing, plans exist for increasing the sales of cement, roofing materials, window glass, forest materials, etc., to consumers.

Considerable attention is paid to the further development of the network of education, culture, public health and communal economy in the republic. The State's expenditures on education, public health and cultural-communal purposes in the republic will increase more than two and one-half times during the seven-year period in the republic. School enrollment during that period will rise to 430,000 persons compared with 279,900 persons at the beginning of the 1958-1959 academic year. In this connection, special attention will be given to expanding the network of boarding schools, where the enrollment will reach 24,000 persons compared with 1,500 persons at the beginning of the 1958-1959 academic year. The enrollment in the schools for the working and rural youth will nearly triple in 1965.

To ensure the students the necessary schooling and vocational training facilities and to curtail considerably the diversity of curricular activities in the public schools, plans exist for assigning 611 million rubles for school construction -- an amount more than four times as high as the capital investments in education made during the preceding seven years. Moreover, a more active participation in school construction is being assumed by the kolkhozes, which will provide the funds for school facilities for 27,500 children. Altogether, during 1959-1965, school facilities for over 100,000 pupils will be constructed in the republic. It is expected that the number of children in kindergartens and creches will double by 1965.

Science will be advanced extensively. The Academy of Sciences Armenian SSR has become a genuine center of scientific thought in the republic. In the 15 years of its existence the Academy has achieved successes in many fields of science. Valuable discoveries and research in science have been accomplished by the Byukaran Observatory and by the institutes of physics, mathematics and fine organic chemistry. Broad developmental prospects are opening before

the republic's scientific research institutions in the forthcoming seven-year period. The number of scientific research workers of the Academy of Sciences will more than double. New scientific-research institutes will be organized.

The republic's network of cultural institutions will be further expanded. Toward 1965 the number of motion picture theatres in the republic will rise to 670 compared with 395 in 1958. Armenia's workers will be given new rest homes and sanitariums. The number of sanitarium beds will increase by 33 percent, inclusive of the sanitarium beds in the spas of Dzhermuk, Arzni and Dilizhan.

One of the indexes of improvement in the economic welfare of the population is the natural population increase. Armenia's natural population increase considerably exceeds the increase in a number of other countries, and, moreover, the coefficient of increase is rising year by year as a result of the decline in mortality and a high coefficient of births. Thus, while in 1940 the natural increase per 1,000 inhabitants amounted to 27.4 persons, in 1956 it amounted to 30.4 persons. The population of the Armenian SSR has also increased as a result of the return of Armenians living abroad to their homeland. Soviet Armenia has become a magnet attracting all Armenian workers living in the capitalist countries. As is known, since 1924 about 180,000 Armenians returned home and became active builders of communism. Calculations show that by the end of the seven-year period the population of the Armenian SSR will increase by 390,000 persons as the result of natural increase alone, and it will total approximately 2.2 million persons.

The notable rise in industrial output, coupled with the expansion of the network of the enterprises and institutions of culture, public health, trade, and communal economy, will lead subsequently to a rapid increase in urban population. In the years of Soviet power Armenia's urban population has grown more than eightfold compared with 1913. The appearance of the cities has also altered drastically. The republic's capital -- Yerevan -- has become one of the larger cities of the Soviet Union, with a population of over 500,000; no less striking changes have also occurred in the other cities of the republic. Since 1923 the dwelling area of Armenia's cities and towns has increased nearly sevenfold; considerable funds were invested in the development of communal economy. In the years 1959-1965 more than 3.2 million square meters of new dwelling area will be introduced into cities and towns, which will increase nearly 1.6 times the dwelling accommodations available for the urban inhabitant.

Radical changes have taken place in the appearance of the Armenian village. The preponderant part of dwelling accommodations in rural localities was built during Soviet power. In the course of the next few years a great deal of work will be done to re-plan and improve rural construction. The kolkhozes will not only build clubs and other cultural, material and educational facilities, medical establishments, schools, kindergartens, creches, and interkolkhoz enterprises for processing agricultural raw materials, but also they will be extensively engaged in planting greenery, providing the villages with communal amenities, and improving rural and interkolkhoz roads.

Major attention is also paid to communal construction in the republic, which will result in a considerable improvement in the communal-living standard of the population. The years 1959-1965 will be a period of expansion of the capacities of water supply mains and their networks, considerable increase in the capacities of the sewage network, expansion of the network of urban transport, urban electricity, public baths and laundries, and other public utilities. Special attention will be given to the gasification of the republic's cities: [natural] gas will be piped into 100,000 apartments during the seven-year period.

Armenia's workers have unanimously acclaimed the decisions of the 21st CPSU Congress and, inspired by the extensive program for the building of communism, they have actively joined the struggle for converting into life the goals enunciated by the Communist Party. The workers, engineers and technicians of the industrial enterprises have pledged themselves to fulfill ahead of schedule both the 1959 plan and the Seven-Year Plan. The activists of Armenia's Sovnarkhoz met and pledged themselves to implement the yearly plan ahead of schedule and to provide the country with 214 million rubles of output in excess of the plan. A number of enterprises of the republic's machine building industry -- a compressor plant, the Machine Tool Plant imeni Dzerzhinskiy, automobile spare parts plants, small hydro-turbine plants -- have adopted concrete pledges to fulfill the Seven-Year Plan in six years and to produce output in excess of the plan in 1959.

The results of the work done in the first half of 1959 attest eloquently that Armenia's workers are successfully fulfilling their pledges. The half-year's plan of industrial output in the Armenian SSR was fulfilled 104.2 percent. The volume of industrial output in the first half of 1959 increased by 12.6 percent compared with the first

half of 1958. The rise in capital investments in the enterprises and organizations subordinate to the Council of Ministers Armenian SSR in the first half of 1959 amounted to 112 percent compared with the investments made in the first half of 1958. Compared with the first half of the previous year, labor productivity in the republic's industry has risen by 6.5 percent. There is no doubt that the workers of Soviet Armenia will successfully continue to labor and will make their own meritorious contribution to the cause of the building of the communist society.

## 2. A New Large Petroleum Region

[This is a translation of an article written by B. Rukhin and N. Skvortsov in Narodnoye Khozyaystvo Kazakhstana (National Economy of Kazakhstan) No 11, Nov 1959, pages 57-58.]

The decisive orientation toward the pre-empting development of the production of the most economical types of fuel -- petroleum and gas -- has inspired the geologists with greater energy. The persistent prospecting activities conducted in the western area of Kazakhstan at last have become crowned with success. The collective of the "Aktyub-nefterazvedka" Petroleum Prospecting Trust of the Ministry of Geology and Conservation of Mineral Resources, Kazakh SSR, has discovered the large Kenkiyak Petroleum Deposit. The new deposit is located in the Temirskiy region of Aktyubinskaya Oblast, 75 kilometers to the southwest of the Emba Railroad Station. On that deposit, structural-exploratory drilling has uncovered two oil beds occurring on the rather shallow depths of approximately 350-500 meters. The thickness of each bed is 20-50 meters. During the testing of the Permian-Triassic (lower) bed, in August 1959, a thick gusher 20 meters high erupted from Well No 34. The yield of petroleum averaged 50 tons daily. The excess pressure in the mouth of the well amounts to 17 atmospheres. The petroleum is of high quality, oily with a specific gravity of 0.87, and low-sulfur. The Jurassic (upper) bed was tested in May of this year in Well No 17. This yield could not be exactly determined because the test-core tubes were clogged by sand "plugs" forming during their rise to the surface. Inasmuch as the sand in the tubes was raised to a considerable height, it can be concluded that the Jurassic petroleum bed has a high stratal pressure and is industrially exploitable. At present, measures to eliminate the sand "plugs" in Well No 17 are being taken, and the tests of that well will be continued. The other structural-exploratory wells drilled in Kenkiyak -- Nos 16, 18, 27, 30, 33 -- were not tested, but in them the presence of petroleum manifestations was also coupled to the Jurassic and Permian-Triassic horizons.

According to the data of seismic work and structural-exploratory drilling, the petroleum beds of the Kenkiyak Deposit belong in the geologic temetable of a large domelike structure unbroken by salt-dome tectonics, with very steeply dipping slopes. The Kenkiyak Deposit is bordered in the

north and northeast by two extensive areas -- Kumsay and Martuk -- which are also promising petroleum regions.

The Kenkiyak Deposit and the Kumsay and Martuk areas compose together a single petroleum and gas region with an over-all extent of 400-500 square kilometers, in which the most promising strata are the very thick salt-overlying Jurassic and Permian-Triassic sediments and the salt-underlying Upper Paleozoic deposits.

The geological peculiarities of this new petroleum and gas region differ conveniently from those of the neighboring salt-dome area and folded regions of the Aktyubinsk-Ural Area, Mugodzhary Area and the South Emba Elevation. In the new petroleum and gas region the structures are large, of the platform type, unbroken by salt-dome tectonics. The salt-underlying Upper Paleozoic sediments begin at a depth of not more than 2,000-3,500 meters. Such depths are definitely accessible to prospecting drilling.

Thanks to the satisfactory geological features of this new petroleum and gas region, a highly efficient conduct of geologic prospecting work can be expected to reveal very extensive deposits of petroleum and gas.

The location of this new region in a populated area not far from a railroad line and from the Gur'yev-Orsk Petroleum Pipeline, and the shallowness of the occurrence of the already known deposits as well, make it possible to explore considerable reserves within a short period and to develop large-scale extraction in this region even before the seven-year period is over.

In accordance with the conditions of the new deposit, plans exist for conducting there deep and structural-exploratory drilling in 1960, so as to complete in 1961 the exploration of the known petroleum beds and their preparation for industrial exploitation. The prospecting for new petroleum beds in the salt-overlying and -underlying complexes at considerable depths and the long-range appraisal of the petroleum and gas reserves of the region as a whole should be made in 1961. The volume of deep prospecting drilling planned for 1960 will reach 20,000 meters, and that of structural-exploratory drilling -- 60,000 meters.

The seismic work will be centered to the northeast and southwest of Kenkiyak, along the transition zone, and conducted throughout the area offering prospects for the finding of petroleum and gas. Deep prospecting drilling and seismic work will be centered in the Burankul' Deposit.

The conduct of these activities in the new petroleum region and on the Burankul' Deposit will be partly

materialized as a result of the discontinuation of activities in the Upper Paleozoic folded complex of the Aktyubinsk-Ural Area and in other little-promising regions. The transfer of the related facilities has already been undertaken by the "Aktyubnefterazvedka" Trust, and this has made it possible to begin deep drilling in the Kenkiyak Deposit in September 1959.

In view of the prospects offered by the new region, the prospecting and exploratory work there will be continued over a lengthy period of time. To assure the success of this work, the Ministry of Geology and Conservation of Mineral Resources, Kazakh SSR, should execute a complex whole of economic measures, the principal ones being: construction of trunk water-supply lines, erection of modern workers' settlements, building of a vehicular road and a rail base for ensuring the round-the-clock communication between the region and one of the railroad stations, ensuring the repairs of drilling equipment, and training local cadres of drillers.

The discovery of the new large petroleum region in Aktyubinskaya Oblast is a major event in the development of Kazakhstan's petroleum industry. It will serve as a notable contribution to the materialization of the goals outlined by the Seven-Year Plan of the Development of the National Economy of the Kazakh SSR.

### 3. The Expansion of Pipeline Transport in Kazakhstan

[This is a translation of an article written by N. Z. Rubinov in Stroitel'stvo Truboprovodov (Construction of Pipelines), No 10, Oct 1959, pages 29-30.]

The over-all extent of petroleum trunk pipelines and petroleum-products pipelines passing through the Kazakh SSR exceeds 1,500 kilometers. In the course of the seven-year period the network of trunk pipelines in Kazakhstan will be considerably expanded. For the very first time, the republic's territory will also be crisscrossed by long-distance gas pipelines.

The construction of trunk pipelines in Kazakhstan began in the years of the first five-year plans. The Gur'yev-Orsk Pipeline with a diameter of 325 mm and an extent of 709 km was built to supply raw material to the Orsk Oil Refinery. Through that pipeline is pumped the crude extracted from the wells of Western Kazakhstan. A number of smaller pipelines for pumping crude from local wells has been connected to that pipeline. At present the over-all extent of these spur petroleum pipelines, with diameters of 168, 219, and 273 mm, exceeds 400 km.

The western regions of Kazakhstan are also bisected by the Astrakhan'-Saratov Pipeline built in 1943-1944 from the 325-mm pipes of the dismantled Baku-Batumi Petroleum Pipeline. Until 1956 the light petroleum products from Baku used to be pumped through that trunk pipeline.

The delivery of fuel was quite complicated. The petroleum products destined for Astrakhan' had to traverse the Caspian Sea, and those shipped from Saratov and Urbakh were exported to various regions of the country by rail and by water. The rapid rise in the extraction and processing of petroleum in the country's eastern regions and the shifts in the destinations of the principal petroleum shipments dictated the necessity of converting the Astrakhan'-Saratov petroleum-products pipeline to a petroleum pipeline. Thereafter that pipeline began to operate in the reverse direction, pumping fuel from Saratov to Astrakhan'.

The next trunk pipeline to be built across Kazakhstan was the Ufa-Chelyabinsk-Omsk Pipeline, with a diameter of 377 mm, constructed in the postwar years for pumping in an eastward direction the products of the Bashkiryan oil refineries.

This trunk pipeline bisects the entire Severo-

Kazakhstanskaya [North Kazakhstan] Oblast, from west to east. The extent of its segment passing across Kazakhstan's territory is about 200 km.

In order to cut the costs of the delivery of petroleum products to users, several small-diameter spur pipelines for pumping off and distributing commercially petroleum products were connected to this trunk pipeline.

The year 1955 witnessed the completion of the first Tuymazy-Omsk Petroleum Pipeline for supplying oil refineries with Bashkiriyan and Tatariyan crude. This pipeline passes across the Severo-Kazakhstanskaya Oblast parallel to the Ufa-Omsk Petroleum-Products Pipeline.

At present two other trunk pipelines running in the same parallel direction are being completed: the second Tuymazy-Omsk pipeline, with a diameter of 720 mm, and the second petroleum-product pipeline from Ufa. During the seven-year period a third Tuymazy-Omsk pipeline will have to be built.

Pursuant to a decision of the 20th CPSU Congress in the immediate future Central Kazakhstan will become the site of the construction of a new oil refinery which will be supplied with crude from the wells of Bashkiriya and Tatariya. The crude will be transported through the Omsk-Pavlodar Pipeline which will be built during this seven-year period.

As a result of the intensive colonization of virgin and fallow lands and the dynamic development of industry and transport in Kazakhstan, the local demand for petroleum products has greatly risen in the past five years. The consumption of automobile gasoline and diesel fuel in the republic has increased more than five or six times, and inevitably it will rise further.

By now, however, the drastic rise in the demand for liquid fuel is burdening the imports of petroleum products, the bulk of which is delivered by rail. These difficulties can be liquidated only by laying new pipelines for supplying, primarily, the northern regions of Kazakhstan where the bulk of the colonized virgin lands is concentrated. The Kustanayskaya, Severo-Kazakhstanskaya, Akmolinskaya, Karagandinskaya, Pavlodarskaya, and Kokchetavskaya oblasts consume at present approximately 70 percent of the petroleum products delivered to Kazakhstan.

The seven-year period will witness the construction of the North Kazakhstan Petroleum-Products Pipeline, whose starting terminus will be one of the pumping stations of the present Ural-Siberian Petroleum Products Pipeline running from Ufa to Omsk.

A major segment of the route of the future North Kazakhstan Pipeline will pass through regions consuming a great deal of liquid fuel, and therefore, to reduce transport expenditures, the local petroleum bases of the Kazakh-snabneftesbyt [Kazakh Petroleum Supply and Marketing Board] and the bases of sovkhozes and kolkhozes will be connected to that pipeline. A particularly tangible economic effect will be yielded by the connection to that pipeline of many kolkhoz and sovkhoz petroleum bases, because this will make it possible to abandon the expensive transport of petroleum products by automobiles.

Initially the North Kazakhstan Trunk Petroleum-Products Pipeline was envisaged as one running in the Kurgan-Atbassar direction parallel to the recently built Kurgan-Peski Railroad Line. However, of late, two other versions have also been placed under consideration. The first version was proposed by the former TsNIITENEft' [Central Scientific Research Institute of the Economics of Petroleum], and it is favored by public opinion in Bashkiriya.\*

This version supports the Salavat-Kartaly-Atbasar direction. The other version of the petroleum-products pipeline supports the Chelyabinsk-Kustanay-Atbasar direction, and it is advocated by the Kustanay oblast organizations.

Economic studies showed that the optimal effectiveness will be yielded by the construction of the pipeline in the direction of the latter version. In its final analysis, this version will yield the maximal savings in transport expenditures on the delivery of petroleum consignments to users. The route will then pass through major centers of demand for automobile gasoline and diesel fuel in Chelyabinskaya, Kustanayskaya and Akmolinskaya oblasts. The petroleum-products pipeline will provide fuel to users in Troitsk, Kustanay, Amankaragay, Yesil'ye and other points.

The end terminus of the pipeline will be Atbasar -- a major agricultural region of Akmolinskaya Oblast; subsequently its route will be extended to Akmolinsk.

The North Kazakhstan Trunk Pipeline is planned to be a "single-track" one. Gasoline and diesel fuel will be alternately pumped through the same pipe. The extent of the new pipeline will be approximately 700 km.

As is known, the largest natural gas deposit in

---

\* Z. Nuriyev. "Petroleum Resources of Bashkiriya to Serve the Homeland," "Pravda," 10 Jan 1959.

Central Asia is going to serve as the basis for constructing large trunk gas pipelines: Gazli-Chelyabinsk and Gazli-Sverdlovsk. A considerable segment of the route of both these gas pipelines will pass through various regions of Kazakhstan. Gas will be received by industrial enterprises and populated areas in Kazakhstan, including the cities and towns of Aktyubinskaya and Kustanayskaya oblasts.

The high-calory natural fuel of the Bukhara-Khivinsk Deposit will also be delivered to Kazakhstan's capital -- Alma-Ata. For this purpose, plans exist for laying the Dzharkak--Bukhara--Tashkent--Chimkent--Alma-Ata Gas Pipeline, through which gas will be delivered also to the southern regions of the republic adjacent to the Arys'--Alma-Ata Railroad Line.

The cities of Chimkent, Dzhambul, and Leninzhn will be gasified. The capitals of Kirgiziya and Tadzhikistan -- Frunze and Stalinabad -- will also be connected to the pipeline.

The construction of this trunk gas pipeline has already begun. Work is in full swing on the first segment, Dzharkak-Bukhara-Tashkent, which should be ready for operation by the end of the next year. Work on the pipeline is expected to terminate in 1965. The extent of this gas pipeline, inclusive of the spur pipelines to Frunze and Stalinabad, will exceed 1,500 km.

#### 4. Some Problems in Connection With the Planning of Oil Refineries

[This is a translation of an article written by M. A. Veytsman, F. K. Mironenko and B. L. Shtukater in *Pro-myshlennoye Stroitel'stvo* (Industrial Construction), No 11, Nov 1959, pages 6-9.]

Modern oil refineries, which are called upon to satisfy the growing demand of the national economy for variegated petroleum products and to ensure with raw material the expanding chemical industry, are characterized by a complexity of numerous technological processes.

Every process is conducted on technological installations consisting of a number of complex buildings and structures equipped with diverse technological apparatuses and facilities.

The servicing of such installation requires a fixed staff of skilled workers, engineers and technicians, and their lay-out and the related plant-wide economics require a considerable territory, and hence also kilometers-long networks of diverse intra-plant communications. The construction of large-capacity oil refineries in many of the country's regions, as envisaged in the Seven-Year Plan, requires considerable capital investments and numerous new production cadres. This adds particular urgency to the problem of reducing capital expenditures and raising labor productivity in the construction of oil refineries.

At present, the drafting of projects of such plants provides for enlarging their facilities, i. e., increasing the capacities of their apparatuses and equipment. Standard installations -- each of which supplants three or even six previous installations conducting the same process -- have been designed. In terms of raw material units, this yields a savings of as much as 25 percent in capital expenditures.

In addition to enlarged installations, combined installations are also used. The Giprogrozneft' [State Institute for the Design and Planning of the Groznyy Petroleum Industry] has designed standard combined installations for processing petroleum with capacities of three and six million tons annually. As distinguished from the enlarged installations, such combined installations not only have higher-capacity equipment but also unify several different technological processes: the atmospheric-vacuum distillation of petroleum (three to six million tons annually); the secondary distillation

of the benzine [gasoline] fraction of petroleum; catalytic cracking of heavy vacuum distillate; destructive distillation of petroleum asphalt; and compression and absorption of gas and stabilization of benzine.

Thus, a single combined and enlarged installation replaces a complex consisting of five separate enlarged installations, which excludes intermediate flow stoppages and intra-shop repumpings and reheatings and recoolings of petroleum products, and which, as well shortens the length of piping in between the installations. This also reduces substantially the number of servicing personnel and the capital investments per production unit. The territory needed for the lay-out of technological installations is consequently also greatly reduced.

The projected combined installations with capacities of three and six million tons compare as follows with sets of separate installations of the same capacity: consumption of fuel is reduced two and 2.18 times; consumption of water -- two and 2.14 times; servicing personnel -- 2.8 and 4.15 times; area -- 4.5 and 4.5 times; reduction in operating expenditures -- 1.7 and 1.99 times; and reduction in capital expenditures -- 1.7 and 2.26 times.

The use of combined installations as part of the project drafted by the Giprogrozneft' for the construction of an oil refinery has made it possible to reduce unit capital expenditures by 24 percent, production costs -- by nine percent; and plant personnel -- by 17 percent; and to raise labor productivity by 14 percent.

In addition to the technological measures for reducing the construction costs of oil refineries, of no smaller importance are the measures for a rational solving of the construction part of their projects.

The customary practice of the planning of oil refineries mainly provides for installing technological apparatuses outside the buildings on separate foundations or pedestals. At present the Geprogrozneft' also plans for the outside installing of a majority of the pumps handling non-congealing products, which previously used to be installed in pump buildings. This reduces considerably the volume of pump-station buildings and the extent of intra-installation communications by shortening the distance between the pumps and the apparatuses.

A no less important factor affecting the economicality of construction, and the improvement in operating conditions as well, is the concentration within one building of several processes previously conducted in separate buildings. It is

necessary to provide every installation with only one building -- or at most two buildings -- as this will reduce considerably the refinery area.

The structural components of the buildings and structures of a modern oil refinery are basically planned in precast reinforced concrete, inclusive of the elements which in the recent past were executed in metal, wood or monolithic reinforced concrete (pedestals for heat exchanger equipment, foundations under individual apparatuses, piping struts, graduating towers, etc.).

In this connection special importance is beginning to be attached to the problems of the unification of spatial layout solutions, "typization" of structures, and standardization and numerical reduction of type-sizes. However, for the oil refineries, the solving of these problems involves considerable difficulties inasmuch as their projects are drafted by so many different project-design organizations.

In the opinion of the writers of this article, in order to solve this problem it is necessary to precede the drafting of refinery blueprints by the formulation of rigorous technological requirements and the compilation of a catalog of standardized precast reinforced concrete structural components and parts mandatory for all the organizations participating in drafting the project of a given refinery. Such a catalog and such technological requirements are being compiled by the Giprogrozneft' for the oil refineries. Analogous TU [technological requirements] and a catalog have been compiled, upon the proposal of the Giprogrozneft' by the Promstroyproyekt [State Design and Planning Institute of the Construction Industry] for a petrotechnochemical combine also.

Such a catalog should include a minimal number of type-sizes of precast reinforced concrete components; however, their variety should be broad enough to ensure fully the possibility of a rational solving of all the structural components of the buildings and structures of an oil refinery.

Such a catalog should be a component part of the catalog of standardized reinforced concrete products compiled for the industrial construction in a given economic rayon as a whole on the basis of an all-Union catalog.

The catalog in question should also include the reinforced concrete components not included in the all-Union catalog, e. g., piping struts, parts of semi-underground impassable canals, elements of tanks and cisterns, drainage and pouring facilities, etc.

The type-sizes of these structural components should be

adopted according to the standard designs developed for the given branch of industry.

When compiling a catalog for a specific industrial region it is necessary to take into account the peculiarities of local climatic conditions, possibilities of construction bases, presence of local building materials, etc.

The most widespread type of building in oil refineries is a single-story, single-aisle building equipped with cranes having lifting capacities of up to 15 tons, or without cranes.

The majority of these buildings is equipped with cranes lifting not more than five tons. If in these buildings the overhead cranes are replaced by suspension crane booms then, first, the required ceiling height will be reduced and, second, the need for a reinforced concrete framework will be dispensed with. Also, the carrying capacity of the walls could then be fully utilized. The repeated attempts of the Giprogrozneft' to replace the manual overhead cranes by suspension crane booms with lifting capacities ranging from two to five tons (GOST [State Standard] 7413-55) ended in failure, because industry is manufacturing suspension booms with lifting capacities of not over one ton. It is necessary that the hoisting-transporting equipment plants organize the production of suspension crane booms commensurate with the entire nomenclature of that State Standard.

The planning of multi-story buildings incorporates successfully the Giprotis-developed [Giprotis -- State Institute for Prototype Design and for Planning Research] units of multi-story production buildings for the chemical industry with a network of 6x6 meter pillars -- Series 1-82-R.

The practice of designing such buildings has shown that the specific nature of individual technological processes and the interrelationship of equipment sometimes prevent their inclusion within the standard floor heights stipulated in standard sections (altogether there exist four nominal height sizes, with not more than two such sizes for any single building regardless of the number of floors). In the opinion of the present writers, such rigid requirements, which often lead to uneconomical solutions, are unfounded and they have been established solely for the purpose of limiting the type-sizes of the pillars. In this connection, the height of a pillar could be easily altered by means of intermediate partitions without increasing the number of type-sizes of its top.

Components of precast reinforced concrete structures in the same series have found broad application in the design of precast reinforced concrete pedestals carrying technological

equipment (heat exchangers, reboilers, reflux capacities, etc.). In this case it is even more inconvenient to restrict the height of floors, because usually the equipment mounted on pedestals is technologically related in height to all remaining equipment and facilities of an installation. We have designed such pedestals for a number of installations.

In the complex whole of the construction of an oil refinery the piping occupies a special place. At present it is a practice to lay most of the pipes in the overhead form; however, the problem of their supporting structures has not yet been resolved in a proper manner.

Various project-design organizations employ differing methods of determining the loads on the pipe-supporting structures. The VNIIST published [VNIIST -- All-Union Scientific Research Institute of Hard Alloys] "Directives Concerning the Determination of the Loads on Piping Supports and the Permissible Spans Between Supports" were not confirmed by the Gosstroy SSSR [State Committee on Construction of the Council of Ministers USSR], and hence they are not obligatory for all project-design organizations. The pipe-carrying supports are constituted by individually standing struts and trestles with spanned carrying structures. In this connection, every project-design organization uses its own standard blueprints.\* In the majority of cases, comparisons of the economic expediency of the use of struts or trestles are not made. The decisive factor is the tradition that has established itself in the individual project-design organization. The supporting structures for piping, which directly transmit load stress to the structural components, remain on the level of those used in the 1930's.

When drafting the construction part of an oil refinery project, it is necessary to ensure the reliability of the installation in building structures of a great number of variegated technological apparatuses and other machinery including cumbersome and heavy equipment.

When solving the problems of precast reinforced concrete structures, the standardization of components hinges considerably on the following conditions:

- (1) Nature of the spatial and planar lay-out of the apparatuses and equipment;

---

\* At present the Khar'kov Division of the Promstroyproyekt is, in accordance with the Standard Design Plan, working out standard designs of trestles and props for pipes (Editor)

(2) Nature of the lay-out and dimensions of supporting parts;

(3) Method of servicing and repairs;

(4) Method of assembling and disassembling.

The conditions in points (1), (3) and (4) are determined by the project-design organization itself. As for point (2), its conditions are determined by the organizations designing the equipment.

Hitherto the requirements of the standardization of structural components has not been taken into account when designing apparatuses and equipment, because not so long ago these components were executed principally in monolithic reinforced concrete, and the lack of coordination in the dimensions and lay-out of the supporting parts of equipment, which hardly differed in their over-all dimensions, had not affected the design of the structure particularly.

But now it is time to revise seriously the existing standards for apparatuses and equipment, for the purpose of coordinating them with the requirements of the standardization of structural elements. In this connection it is important that the organizations concerned with drafting the projects of oil refineries should operate with coordinated, concrete recommendations.

The TsKBN (Central Design Bureau of Petroleum Equipment) has already commenced this work, which should be continued in close contact with the leading organizations drafting the projects of oil refineries.

When solving problems of the repair of equipment and apparatuses, the project-design organizations have adopted the new ultra-progressive and economical entire-assembly method, in which an apparatus or mechanism subject to repair is dismantled in its entirety and replaced by a new one from the storehouse while the repair is conducted on special and properly equipped repair bases. Such a method requires extensive stationary hoisting-transporting equipment, whose efficiency is very low. The necessity of installing in buildings and on structures various overhead, suspension and mono-rail cranes complicates structural design considerably and increases greatly the dimensions of buildings and structures a fact which, in the final analysis, raises the costs of construction and operation. The time is ripe for designing and developing the mass production of small, ground-based, self-propelled hoisting and transporting equipment with a sufficient lifting capacity (five to 10 tons), which could drive directly in and out of a building.

The assembling and disassembling of apparatuses on

pedestals that are up to 20 meters high requires also giant self-propelled crawler or wheeled cranes with lifting capacities of as much as 50 tons. The hoisting-transporting equipment should be explosion-proof.

These measures would lead to a drastic decline in costs, reduction in construction periods, and reduction in operating expenditures.

At the present all the installation operations involved in the construction of large oil refineries and individual installations are conducted by the huge well-equipped, specialized organizations of the Glavneftemontazh Minstroy RSFSR [Main Administration for the Installation of Oil Refining Equipment, Ministry of Construction RSFSR]. It is important that the designing of such refineries and solving of the problems of ensuring with industrial methods the large-unit construction and installation of apparatuses and equipment should take into account the possibility of an efficient utilization of the available equipment of the installation organizations.

The Giprogrozneft' conducts its design activities in close contact with the Glavneftemontazh. Such mutual relations assist in a timely averting of mistaken solutions and in anticipating in a project the measures necessary for installing the equipment (accessories for the tackle gear, anchor, stones for sling ropes, platforms for enlarged assembling etc.).

The problems touched upon in this article far from exhaust all the possibilities for improving the designing and construction of oil refineries.

In the opinion of the authors of this article, to improve performance, the Gosstroy SSSR should promote close daily business ties among project-design organizations for the purpose of mutual exchange of experience and information, development and introduction of standard solutions specific for a given branch of industry, etc.

Such close ties were formed in October 1958 when representatives of the leading project-design organizations of the petroleum industry convened to reexamine the fundamental postulates of the designing of oil refineries formulated as long ago as in 1956. However, that conference was an isolated event, and it has not as yet yielded any results in the sense of new fundamental postulates, so that the now obsolete fundamental postulates still have to be used as guides.

## 5. Long-Range Plans for Developing a Coal Base for Coking in the Southern USSR

This is a translation of an article written by A. M. Miroshnichenko and B. I. Shtromberg in Koks i Khimiya (Coke and Chemistry), No 12, Dec 1959, pages 3-6.

### A Brief Description of the Coal Base for Coking in the Southern and Central European USSR

The Donbas Donets Basin is the coal base for coking in the Southern and Central European USSR. The production of coke from Donets coals amounted to 26.0 million tons in 1956, 26.8 millions in 1957, and 28.5 millions in 1958, and according to the draft of the Seven-Year Plan, in 1965 it should reach about 46 million tons.

At present only the Middle Carboniferous coals from the Industrial Donbas are used for the production of coke. It is expected that the Lower Carboniferous coals whose presence has been discovered in Dnepropetrovskaya Oblast (Western Donbas) and in the south of Stalinskaya Oblast (Southern Donbas) will also eventually be used for coking.

The Western and Southern Donbas contains Lower Carboniferous slightly metamorphized coals marked by a high yield of volatile substances, high sinterability, and comparatively low sulfur content -- up to 2.5 percent.

In 1959-1965 it will be possible to use the coals of the Western and Southern Donbas only in small amounts (about two and one-half million tons by the end of 1965) as a charge component blended with the coals of the Industrial Donbas.

In the west of the Ukrainian SSR, in L'vovskaya and Volynskaya oblasts, a new coal basin has been discovered. Its known reserves in the industrially exploitable categories A<sub>2</sub>+B+C<sub>1</sub> amount to 1,265 million tons in which grade-G gas coals account for 930 million tons, and grade-G--D gas and long-flaming coals, for 335 million tons.

The total extraction of coal in the L'vov-Volyniya Basin should reach 9.7 million tons by the end of the seven-year period. The coals of that basin are mostly of the medium-and high-sulfur type. Individual coal seams in certain mines are composed of medium-sulfur coals. The concentrates of these coals can be regarded as a raw material for obtaining valuable chemicals and for nodulization into power station fuel.

Thus, during the 1956-1965 period and during the first decade following that period as well, the Donets Basin will

remain nearly the only purveyor of coking coal in the Southern and Central European USSR..

The balance-sheet geological reserves of coals of the Donets Basin (including the Lower Carboniferous coals) down to a depth of 1,200 meters in seams more than 0.45 meter thick amount to excluding the long-flaming grade-DB coals whose properties are close to brown coals) approximately 118 billion tons, according to the latest data. Classified according to grade, these balance-sheet reserves are as follows: D -- 13.5 percent; G -- 31.6 percent; Zh -- 6.3 percent; K -- 4.2 percent; OS -- 3.4 percent; T -- 8.8 percent; and A -- 32.2 percent.

These data confirm that the percentile share of coking coals of the principal grades -- Zh, K, and OS -- in the reserves has declined (13.9 percent), compared with the reserves appraised in 1937 (23.7 percent). Such a decline is to be explained by the fact that the increment in known reserves in the Basin has occurred mainly on account of the slightly metamorphized coals.

The depth of occurrence of coals of the individual grades (according to the estimate of reserves on 1 January 1958) is characterized by the figures cited in Table 1.

Table 1

Coal Grade	Balance-Sheet Geological Reserves of Coals (in percent in Seams More than 0.45 meters Thick (Excluding DB Coals), Down to the				
	Depth of				As far Down as 600 Meters
	300 Meters	300-600 Meters	600-1,200 Meters	Total	
D <u>Long-flaming</u>	11.0	28.9	60.1	100.0	39.9
G <u>gas</u>	16.3	29.0	54.7	100.0	45.3
Zh <u>fat</u>	16.5	30.0	53.5	100.0	46.5
K <u>coking</u>	14.5	29.7	55.8	100.0	44.2
OS <u>lean-sintering</u>	19.4	25.0	55.6	100.0	44.4
T <u>hard</u>	25.6	29.4	45.0	100.0	55.0
A <u>anthracite?</u>	22.6	29.1	48.3	100.0	51.7

As can be seen from Table 1, the known geological reserves of the principal grades of coals used for coking occur at an approximately identical depth.

The grade structure of the coal reserves (including the Lower Carboniferous coal) circumstantially explored and

contoured by mine passages and boreholes on the territory of the Industrial Donbas is presented in Table 2.

Table 2

Coal Grade	Reserves in Categories A <sub>2</sub> +B+C <sub>1</sub> in percent	Extraction in percent	
		1955	1957
D	14.2*	5.3	1.4
G	33.2	14.6	18.2
Zh	9.7	16.5	14.4
K	5.0	8.7	7.7
OS	5.2	5.5	4.7
T	7.6	7.4	7.1
A	25.1	42.0	46.5
Total	100.0	100.0	100.0

\*Coals with industrial properties in between long-flaming (D) and gas coals (D-B) are classified in grade D

From Table 2 it can be seen that the share of the principal coking grades of coals -- Zh, K, and OS -- in 1957 extraction had declined 3.9 percent in comparison with 1955, while at the same time the share of gas coal had risen appreciably (by 3.6 percent).

Apparently, this trend for a change in the grade structure of coal extraction will continue to manifest itself in the future, and this should be taken into account when drafting estimates of the reserves of promising mines.

In an appraisal of the developmental prospects of the coal base for coking it is also necessary to consider that, according to the currently effective sales prices for coal, the cost of one ton of regular gas coals is 20 rubles 90 kopeckas less than the cost of coals of the Zh (PZh) grade, 21 rubles 20 kopeckas less than the cost of grade-K coals, and 22 rubles 50 kopeckas less than the cost of grade-OS(PS) coals. Moreover, the capital investments on the construction of mines with gas coals are lower than for the mines extracting the fat, coking, and lean-sintering coals. According to calculations of the Khar'kov Engineering Economics

Institute\*, this difference amounts to 64 rubles per ton of coal.

All these circumstances have favored the further rise in the percentile share of the extraction of gas coals in the mines, as is graphically illustrated by the dynamics of the shift in the grade composition of charge (Table 3).

Table 3

Years	Composition of Charge by Grade, in percent					
	D	G	Zh	K	OS	T
1933	-	0.1	47.2	30.2	21.0	1.5
1935	-	1.5	44.7	32.1	21.2	0.5
1940	-	7.5	51.3	22.2	19.0	-
1950	-	14.2	45.6	22.3	17.5	0.4
1955	-	17.0	43.6	23.2	15.3	0.9
1957	-	18.9	41.3	23.4	15.4	1.0
1958	-	21.8	41.0	21.2	15.2	0.8
1959 (plan for the first semiannum)	-	21.7	40.4	22.0	15.2	0.7

As can be seen from the figures in Table 3, the introduction of gas coals has been spreading mostly at the expense of fat coals, in which connection the combined share of coking (K) and lean sintering (OS) coals had declined from 41.2 percent in 1940 to 38.8 percent in 1957; in 1959 it amounts to 37.2 percent.

During the period from 1940 to 1957 the technological properties of the charge have also deteriorated because of the addition of poorly sintering and nonsintering coals. The quality of the charge is characterized by the figures shown in Table 4.

\*P. Ye. Sekt, F. F. Teslenko, A. M. Belikov, and S. F. Tkachev, "Ugol'" (Coal), 1959, 1, 20-23.

Table 4

Year	Quality of Charge in percent		
	Ash Content	Sulfur Content	Yield of Volatile Substances
1940	7.73	2.01	24.15
1950	7.64	2.17	25.51
1955	7.46	2.04	25.53
1957	7.53	2.04	25.34
1958	7.40	2.04	25.43

Notwithstanding the notable deterioration in charge composition (see Table 3), the mechanical strength of coke has not only not declined but has even risen (Table 5) thanks to the improvements in the technology of the preparation and coking of charge. However, in terms of its sieve screen composition and crushing strength, the quality of coke has been decreasing.

Table 5

Year	Quality of Coke		
	Ash Content in percent	Sulfur Content in percent	Drum Residue in kg
1940	10.31	1.64	329
1950	10.05	1.79	337
1955	9.57	1.70	343
1957	9.63	1.70	341
1958	9.59	1.69	341

The improvements nevertheless achieved in the quality of coke have also been favored by the increase of the share of dressed coals in the charge. Thus, in 1940 the average percentage of dressed coal in the charge amounted to 77.5 percent, in 1955 -- 90.9 percent, and in 1957 -- 93.1 percent; at present it has climbed to approximately 95 percent. The quality of the coke obtained from charge containing some gas coal has also been positively affected by improvements in the degree of grinding of the charge. Thus, in the pre-war period the content of the 3-0 mesh class in the charge of the principal plants in the Ukrainian SSR amounted to 75-80 percent, in 1948 -- 82-87 percent, and in individual

plants -- 90 percent, while at present it reaches 90-91 percent.

The effect of the degree of grinding of the charge on the quality of coke can be appraised from the figures in Table 6.

Table 6

Coke-Chemical Plant in	Year	Composition of Charge by Grade, in percent				Degree of Grinding of Charge (3-0 mm Class) in percent	Drum Test in kg
		G	Zh	K	OS		
Dnepropetrovsk	1947	18.0	44.0	23.0	15.0	72.7	330.1
	1957	22.5	39.1	17.3	21.1	91.5	343.3
Dneprodzerzhinsk	1947	18.0	41.0	25.0	16.0	86.8	331.6
	1957	24.1	37.0	20.4	18.5	90.4	339.0
Makoyevka	1947	15.0	48.0	18.0	19.0	76.2	338.0
	1957 (VI-X)	25.0	38.6	19.0	17.4	91.0	347.0

It can be seen from the figures in Table 6 that an increase in the degree of grinding of charge is accompanied by an improvement in the quality of coke, even when the share of gas coals in the charge is increased.

#### Prospects for the Expansion of the Coal Base for Coking in the South and Center of the European USSR

In the plans of charge composition for the year 1965 the principal plants are expected to use a charge containing up to 25 percent of gas coal and the following percentile shares of other coals: Zh -- 34-35 percent; K -- 21-20 percent; OS -- 18-20 percent. Individual plants in the Ukrainian SSR are expected to increase the share of gas coals in the charge to 30 percent while setting the share of Zh (fat) coals at 30 percent and the combined share of K and OS coals at 40 percent. The plants producing nonmetallurgical coke could employ a coking charge containing 80-100 percent of gas coals. In the event of an acute shortage of lean-sintering coals it is possible to make an emergency use of hard coals and of long-flaming coals and coke breeze as well.

On the basis of the anticipated composition of charge in 1965, the UKhIN /Khar'kov Coal-Chemical Scientific Research Institute/ has, jointly with the Giprokoks and Yuzhgiproshakht /State Institute for the Design and Planning of Coke-Chemical Industry and Southern State Institute for the Design and Planning of the Coal Mine Construction Industry/, determined the demand for coking coals and the necessary margin of demand, and the possibilities for satisfying that demand. The corresponding indexes of preliminary estimates are cited in Table 7.

Table 7

Demand and Supply	Composition by Grade					Total
	G	Zh	K	OS	T	
Demand for Regular Coals;						
in millions of tons	20.7	30.6	16.1	15.1	0.2	82.7
in percent	25.1	37.0	19.4	18.3	0.2	100.0
Possibility of Satisfying the Demand						
in millions of tons	22.0	33.2	17.1	15.5	0.3	88.1
in percent	25.0	37.6	19.5	17.6	0.3	100.0

As can be seen from Table 7, the demand for coking coals commensurate with the envisaged charge composition can be satisfied so as to allow some reserve on the condition that the plan of the development of extraction of coals by grade is fulfilled and the envisaged separate drawing of coals according to their technological properties is carried out. As for the more remote prospects (1975), considering the trend for a change in the grade structure of coal extraction in the Donets Basin and the planned construction of giant blast furnaces and coke ovens, the UKhIN has worked out the following standard charges for the principal coking plants, with the following percentile composition of coal grades:

(a) Plants producing coke in large ovens and supplying coke to large blast furnaces: gas coal -- 26-28; coking coal -- 19-21; lean-sintering coal -- 18-19.

(b) Plants supplying coke to medium-size blast furnaces: gas coal -- 30; fat coal -- 31-33; coking coal -- 20; lean-sintering coal -- 20-18.

Plans exist for using as much as 15 percent of hard coals in the charge of the plants producing foundry coke. For the coke-chemical plants, the plans envisage using

80-100 percent of gas coals in the charge.

Preliminary calculations based on the grade composition of charges for individual plants as worked out by the UKhIN and on the demand for coking coals as determined by the Giprokoks, indicate that the average grade composition of the coal base for coking in 1975 (excluding the coke-gas-chemical plants and hard coals) will be as follows: gas coal -- 27 percent; fat coal -- 35 percent; coking coal -- 20 percent; lean-sintering coal -- 18 percent.

The experience gained by the coke-chemical industry and the research results indicate that in 1965 and 1975 the charges with the above compositions can yield a coke satisfying the production requirements on modern blast furnaces. The introduction of charge containing 25 percent of gas coals does not cause complications, because at present such charge has already been mastered in a number of major coke-chemical plants of the Ukrainian SSR (in Dnepropetrovsk, Dneprodzherzhinsk, Makeyevka, Yasinovka, Gorlovka) which purvey coke to metallurgical plants.

Charge containing 30 percent of gas coals can also be introduced without further complications or supplementary research. At the Zhdanov Coke-Chemical Plant in 1955 experimental industrial coking tests of a charge containing 30 percent of gas coals, 30 percent of fat coals, 20 percent of coking coals, and 20 percent of lean-sintering coals were conducted. The experimental coke\* was used in conducting smeltings in blast furnaces with volumes of 1,386 and 1,033 cubic meters. The indexes of quality of the coke obtained from that charge were somewhat lower than those of the normal (15-percent gas coal) coke, and the consumption of coke per ton of pig iron was moreover somewhat higher (by 0.5-0.8 percent). However, the blast furnaces did not then operate any worse than on the coke obtained from the normal charge.

The results of the experimental-industrial cokings and the operational practice of the plants as well showed that, for producing coke for large-capacity blast furnaces, a charge containing five or more percent of hard coals can be used only in the event of an acute shortage of grade-OS lean-sintering coals, or for the production of foundry coke. The use of long-flaming coals for producing blast-

---

\*Yu. B. Tyutyunnikov, A. I. Soldatkin, N. N. Dvuzhil'naya and others. "Use of Gas Coals in the Charge of the Southern Coke-Chemical Plants," "Koks i Khimiya" (Coke and Chemistry), 2, 1957, 20-23

furnace coke is justified only in the event of an irremediable shortage of grado-OS coals.

### Conclusions

1. The demand for the principal grades of coking coals in 1965 can be satisfied by the fulfillment of the intended volume of mine construction and the organization of separate drawings of coals with differing technological properties, as adopted in the projects.

2. Preliminary calculations indicate that the demand for coals for producing metallurgical coke in 1975 can also be satisfied on the condition that the percentile share of gas coals in the coking charge in the South and Center of the European USSR be raised to 27 percent on the average, and to 30 percent in individual plants.

3. To preserve the sulfur content of the coke at the present level, it is necessary to encourage the development of mine construction in the Southern and Western Donbas on the seams of gas coals with a sulfur content of less than two and one-half percent.

4. In connection with the use in the coking charge of the difficultly concentratable high-ash and high-sulfur coals which had previously been used as power station fuel, it is necessary to work out more efficient methods of concentrating these coals and, for this purpose, to materialize the construction of concentrator plants.

5. Considering the long-run increase in the use of lean, poorly sintering and gas coals, it is necessary for the plants lacking concentrating shops to introduce schemes for the differentiated grinding of charge components, and for the plants possessing concentrating shops -- to introduce the differentiated grinding of concentrates.

6. In connection with the intended increase in the use of gas coals for coking, some deterioration in the sieve screen composition of coke is to be expected. To reduce the content of the 25-40-mm-mesh class in blast-furnace coke, it is necessary to provide for the segregation of blast-furnace coke larger than 40-mm mesh in the plants purveying coke to blast furnaces.

## 6. Increase Capacities More Rapidly in Ferrous Metallurgy

This is a translation of an article written by K. Zhukov in Promyshlennno-Ekonomicheskaya Gazeta (Industrial and Economic Gazette), 25 Nov 1959, pages 1 and 3.<sup>7</sup>

The historic decisions of the 21st CPSU Congress have clearly outlined the boundaries of the development of ferrous metallurgy. The rising demand of the national economy for metal and rolled products should be satisfied by both the most rapid possible activation of new shops and assemblies and the technological perfecting of the entire metallurgical industry. This also pertains fully to the metallurgists of Lipetsk, where at present operate two enterprises of the extracting industry -- the Lipetsk and Studenovskoye ore administrations, and two large metallurgical plants -- the Novo-Lipetsk and "Svobodnyy Sokol" [Free Falcon] plants.

During the seven-year period the smelting of pig iron in the Lipetsk plants will more than triple, and their smelting of steel will increase eleven times, and output of rolled products -- fivefold. This rise in metallurgical production will be ensured chiefly by expanding the Novo-Lipetsk Plant on the basis of the inexhaustible resources of iron ores of the Kursk Magnetic Anomaly, thus converting it into a giant combine. The scale of the work that is to be done at the Lipetsk "Magnitka" is eloquently illustrated by the following figures: about 14.5 million cubic meters of earth will be moved, 1,280,000 cubic meters of concrete and reinforced concrete will be installed, 580 kilometers of piping will be laid, and as huge a quantity as a million tons of metal and reinforced concrete structures and nearly 150,000 tons of technological equipment will be installed. The construction of the blast furnaces, coke-chemical, rolling-mill and tube-welding shops, and sintering plant, is planned so as to take into account the latest achievements of science and engineering and pace-setting operations.

The Lipetsk blast furnaces will operate on fluxed sinter and on the basis of natural gas and oxygen-enriched blast with a temperature of 1,200°C. The blending, suspension and charging of the burden will be completely automated; automatic devices and perfected control and measuring instruments will facilitate the operation of the new furnaces.

The concentrator plant will be provided with the largest sintering machines in the USSR. It will be the first

to introduce such innovations as the "fluidized-bed" roasting of lime, transfer of the "return" to charge bins by means of electro-vibration tube conveyers, pneumatic transport for conveying fuel and lime, cooling of the sinter by the air directly on the machine.

The steel-smelting shop will be provided with large-capacity open-hearth furnaces and converters. The open-hearth furnaces will utilize magnesite-chrome arches and evaporatory cooling, and it is expected that they will be heated by natural gas, with carburization by mazut; the smelting of steel in the converters will be conducted by the method of blowing oxygen from the top down through the pig iron.

In the shop for the cold rolling of electrotechnical steels, the country's largest and completely automated rolling mills will ensure continuous rolling at the rate of as much as 35 meters a second. The shop for the hot rolling of carbon steels will be provided with large metallurgical assemblies -- a universal slab mill for rolling blanks weighing as much as 30 tons, a "4500" plate mill, improved mechanisms and automatic devices. The tube welding shops will be equipped with highly productive assemblies on which tubes with diameters ranging from six to 1,020 mm will be manufactured from steel skelp by the arc method under a flux, and will be provided with anti-corrosion coatings.

A high level of concentration and intensification of production, and broad use of natural gas, oxygen and the newest rolling equipment will cause the combine's output to be the past expensive in the country. The output per worker will amount to 354 tons of pig iron and 321 tons of steel per year.

The socialist labor competition for a pre-term fulfillment of the plans of capital construction -- originating on the initiative of Sverdlovsk workers and now in full swing -- has found its most ardent support among the builders of the Lipetsk Combine. Using up-to-date technology and mechanisms and utilizing the rich experience of the pace-setting workers, they are rapidly erecting the large buildings of the future combine. In this respect, the collectives of the new shops are striving to master more rapidly the designed capacities of their equipment and are solving boldly and creatively many complex technical problems.

The Novo-Lipetsk Plant has acquired the world's largest installation for the continuous pouring of steel, designed by the Moscow "Stal'proyekt" Institute. There was no precedent for this, and the installation displayed some design

shortcomings, and defects as well, overlooked in the process of its construction at the South Ural Machine Building Plant. The collective of the electric steel smelting shop has, in cooperation with the scientific research workers of the Central Scientific Research Institute of Ferrous Metallurgy, succeeded in mastering the new installation with comparative quickness, upon improving its secondary cooling system, the suspension of the gas-cutting trolley, and the unit of blank guides in the gas-cutting zone, and incorporating a number of other improvements as well. At present this installation receives, together with the electric furnace, full smelting loads; there is no doubt that in the immediate future its full rated capacity will be reached.

The competition for the most rapid activation of new shops and assemblies and improved use of old ones, and the struggle for technological progress, is bearing satisfactory fruits for the metallurgists of Lipetsk. The gross output of the metallurgy of this economic rayon during the first three quarters of this year has climbed by 14 percent, compared with a like period last year. The workers of the rolling mills at the Novo-Lipetsk Plant have worked with conspicuous skill: they have already provided our nation with thousands of tons of steel sheets in excess of the plan.

However, our metallurgists would have been able to utilize their inner potential even more fully, had it not been for difficulties which did not originate with them. How can it be tolerated that, e. g., the Rosglavvtormet [Main Administration of Secondary Metals of the Ministry of Metallurgy RSFSR] supplies the electric steel smelters of Lipetsk, who operate the country's most capacious furnaces, with second- and third-class lightweight open-hearth furnace instead of electric-furnace scrap?

At the same time, the electric steel smelting shop of the Novo-Lipetsk Plant is a veritable laboratory which, essentially, tests the maturity of technical thought of the designers, planners, and builders. The "behavior," the technical-economic characteristics, of the performance of the Lipetsk electric furnaces are of interest to dozens of research institutions and plant collectives. After all, the study of the data determined at Lipetsk can assist designers in devising even bigger and better steel-smelting assemblies in accord with the goals of the Seven-Year Plan. However, the fixed composition of the charge on which this shop operates at present prevents its collective from completely mastering the technology of the smelting of high-grade electrotechnical steels, determining the true production

possibilities of the furnaces and establishing the paths of technological progress for our electrometallurgy.

To obtain more high-grade electrotechnical steels, it is necessary to ensure the continuous operation of electric furnaces. However, at the Novo-Lipetsk Plant the rhythm of their operation is also upset by the low quality of electrodes, which are delivered by the Knepr Electrode Plant of the Zaporozhskiy Sovnarkhoz. The interests of the State require of our electrode industry that it attain the same technological level of progress as that of metallurgy and provide the latter with high-grade output.

Technological progress in metallurgy hinges greatly on the project-design organizations. After all, it is no secret that a new enterprise, shop, or assembly first comes to life on the drawing board of the designer. And if he is a man with a creative spark and is broadly familiar with the latest achievements of science and engineering, and if he has pace-setting experience, then his calculations and sketches lay the foundations for an accelerated pace of construction, highly productive utilization of equipment, and progressive technology.

Practice shows that success accompanies designers only when they work in close contact with the local Party and economic organs. The absence of such contact and interaction often, if not always, spells failure. Here is one example.

The Leningrad Institute "Mekhanobr" [Scientific Research Institute for Mechanical Concentration of Minerals] was commissioned to design the sintering plant for the future Novo-Lipetsk Combine. The Institute's workers proposed locating that plant in the vicinity of the existing blast-furnace and coke-chemical shops. The acceptance of this proposal would mean that the further expansion of these shops would be curtailed; moreover, at the Institute it was not considered that the residential quarters of the workers' settlement lie close to the proposed site of the plant. And yet, the Institute, disregarding the objections of the Gipromez [State Institute for the Design and Planning of Metallurgical Plants] and the Lipetskiy Sovnarkhoz, obstinately adheres to its opinion, thereby impeding the commencement of work on building that plant itself and on building, as well, the blast-furnaces which are to operate on the sinter to be produced by that plant.

The shop for the cold rolling of transformer and dynamo plate is planned for activation in the second year of the Seven-Year Plan. Its opening will terminate the construction of the complex of shops for the production of

electrotechnical steels, which are so essential to the national economy. However, at present the shop's builders are afraid not of deadlines but of trouble with technical documentation. According to a work graph confirmed by the Gosplan SSSR, the Staro-Kramatorsk Machine Building Plant is obliged to provide the Gipromez and the Tyazhpromelektroproyekt [Design Bureau of the Heavy Electrical Machine Building Industry] with initial data for a 20-component rolling mill. However, no such data have as yet been received. The Leningrad Scientific Research Institute of High Frequency Currents imeni Vologdin and the Ural Chemical Machine Building Plant are slow in issuing assignments for the design of foundations, equipment, wiring, etc., which is hampering the design of the second battery of the cold-rolling shop.

The Novo-Lipetsk Combine will specialize in the mass production of high-grade hot-rolled and cold-rolled plate and sheets of transformer, carbon, and alloyed steels, curved sections, and straight-weld tubes. Metallurgists will have to master within short periods of time the operation of unique, high-productivity equipment, to introduce the newest technological processes. Here there is a need for active assistance from the scientific research and design institutes. A constant close collaboration among workers of science and industry is an indispensable prerequisite for accelerated technological progress.

A good beginning was made by the Moscow Institute of Steel, which has established this year an Evening Studies Faculty in Lipetsk. We [Lipetsk Oblast Committee of the CPSU] provided the Faculty with the necessary accommodations and facilities. The Institute is constantly solicitous about equipping the Faculty's laboratories, and its scientific research workers and instructors have formed close and useful ties with the enterprises in our economic rayon.

Recently we were visited by the Director of the Stal'proyekt Institute, Comrade Mantsev. On familiarizing himself with the enterprises of Lipetsk, their activities and problems, he arrived at the conclusion that the Stal'-proyekt could only gain from closer ties with industry. And now we are expecting the establishment of a branch of that Institute in Lipetsk.

And yet, the heads of the Gipromez and the Central Scientific Research Institute of Ferrous Metallurgy apparently have not as yet become aware of the simple and clear need of our time -- the need for rapprochement with industry, for interest in its interests. It is asked how their subordinates,

sitting in Moscow, could execute research work for the Novo-Lipetsk Plant, and solve on the basis of the Plant's experience the principal problems of metallurgical industry?

In Lipetsk the production of cast iron water-supply and sewage pipes has been broadly developed. No other center for the production of such pipes in the country is as large. Our pipe casters were the first in the USSR to master the casting of water-supply pipes by the centrifugal method, and they are diligently working on the devising of satisfactory centrifugal machines of the conveyer type, on the over-all mechanization and automation of production processes. In many ways, the further technological progress of our pipe casting industry hinges on the success of this work. Therefore, it also seems to us expedient to organize in Lipetsk a branch of the Ukrainian Scientific Research Piping Institute.

The Third Session of the Supreme Soviet USSR has adopted the Law of the State Plan of Development of the National Economy for the Year 1960. This Plan envisages major measures for developing ferrous metallurgy in the second year of the seven-year period. The metallurgists and builders of Lipetsk and the oblast Party organizations will spare no effort to ensure another vigorous upsurge of our heavy industry and new accomplishments in the socialist labor competition for a pre-term fulfillment of the Seven-Year Plan.

END